Response to Bjordal et al

We thank Professor Bjordal and colleagues from the World Association for Laser Therapy (WALT) for their interest in our systematic review on interventions for neck pain (Leaver et al 2010). Professor Bjordal identified two material errors that occurred in the data extraction phase of our study that hide a significant benefit for laser therapy for disability at medium-term follow-up. An erratum item in this issue of *Journal of Physiotherapy* (p. 222) explains the source of these errors and corrects the meta-anaylsis accordingly. Our re-analysis indicates that laser therapy is more effective than placebo in terms of pain and disability outcomes at medium term follow-up, but not at the conclusion of a course of treatment.

Our analysis of medium term disability included two trials by the same author (Chow et al 2004, Chow et al 2006) and incorrectly applied exclusion criteria to a third trial (Gur et al 2004). The included trials both used the same disability outcome measure, however used a different scale for each study and this was not apparent in the published article. This explains the 'good' effect that Professor Bjordal obtained with analysis of the standardised mean difference between laser and placebo for disability at medium term. This finding is consistent with our re-analysis, in which the disability outcomes from the trial by Chow et al (2006) were converted to percentage scores, according to our review protocol. This reanalysis of weighted mean difference demonstrates a 'good' effect for laser therapy on disability at medium term (WMD –10, 95% CI –15 to –6).

Professor Bjordal raises additional methodological issues with our review that can be clarified. Concerns about the inclusion of data from a crossover trial (Thorsen et al 1992) without a sufficient washout period are unwarranted because data from time points after the crossover period were not used. Only the outcomes reported at the conclusion of the course of treatment, which was the period immediately before crossover, were included in the analysis. Second, there was no anomaly in the pain outcomes extracted from the trial by Gur et al (2004). These data were extracted at Week 2, which was the conclusion of the course of treatment as specified by our review protocol.

The reasons for variability in pain and disability outcomes across the trials were not easily explained by our review and we suggested that a more detailed review of laser therapy might shed further light on this question. Professor Bjordal and colleagues have since conducted this review (Chow et al 2009) and have suggested that variability in outcomes between trials is related to a dose-response phenomenon. This pattern was not apparent in our review. On the contrary, there were examples of trials that used dosage parameters consistent with WALT guidelines that demonstrated no effect (Dundar et al 2007: 830nm, 7J per point) as well as trials that used doses Professor Bjordal would describe as 'very low' (Ozdemir et al 2001: 830nm, 0.9 J per point) that reported very large treatment effects. Additionally, the WALT guidelines suggest that the number of points treated is a significant dosage parameter. There was very large variation, both between and within the trials reviewed, of the number of points treated (Range 4–50) and hence the total energy delivered during the treatment. The other explanation offered by Professor Bjordal for the variability in outcomes was that the therapeutic effect of laser therapy is characteristically delayed. This phenomenon also was not apparent in our review. Any conclusions about the size of the treatment effect over time were difficult to draw because few trials reported both short- and medium-term outcomes, and those that did had mixed results regarding immediate and delayed effects. We found evidence in some studies of an immediate analgesic effect and in others an apparent delayed effect and we are not aware of any biologically plausible explanation for this finding.

Although not directly related to the discussion on laser therapy, Professor Bjordal also commented on the need to balance benefit and harm in light of our findings regarding pharmacological treatments, and we agree with these comments. The most startling finding regarding pharmacological treatments for neck pain was the lack of quality trials of medication for neck pain. The finding of short-term benefit for orphenadrine/paracetamol, needs consideration in the context of lack of evidence about long term benefit and potential harms.

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